

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 April 2005 (21.04.2005)

PCT

(10) International Publication Number
WO 2005/036224 A1

(51) International Patent Classification⁷: **G02B 6/16**, 6/12

(21) International Application Number:
PCT/GB2004/004257

(22) International Filing Date: 8 October 2004 (08.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0323806.0 10 October 2003 (10.10.2003) GB

(71) Applicant (for all designated States except US): UNIVERSITY OF SOUTHAMPTON [GB/GB]; Highfield, Southampton SO17 1BJ (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SAZIO, Pier, John, Anthony [GB/GB]; Centre for Enterprise & Innovation, University of Southampton, Highfield, Southampton SO17

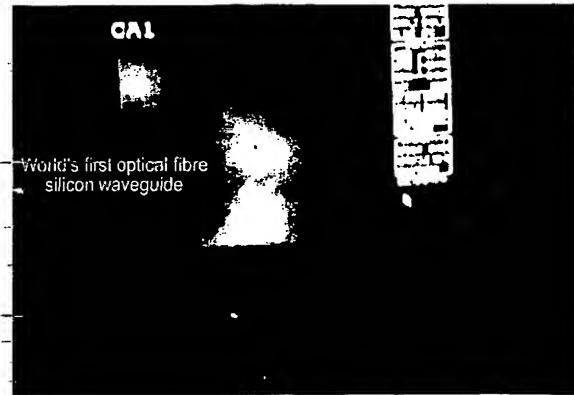
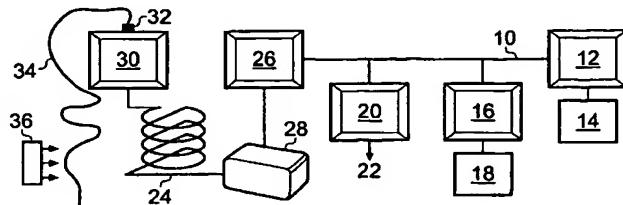
1BJ (GB). BADDING, John, Victor [US/GB]; Centre for Enterprise & Innovation, University of Southampton, Highfield, Southampton SO17 1BJ (GB). HEWAK, Dan, William [CA/GB]; Centre for Enterprise & Innovation, University Of Southampton, Highfield, Southampton SO17 1BJ (GB).

(74) Agents: ROBINSON, Nigel, Alexander, Julian et al.; D. Young & Co., 120 Holborn, London EC1N 2DY (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: FABRICATION OF SEMICONDUCTOR METAMATERIALS



(57) Abstract: A method of fabricating a semiconductor metamaterial is provided, comprising providing a sample of engineered microstructured material that is transparent to electromagnetic radiation and comprises one or more elongate, high aspect ratio voids, passing through the voids a high pressure fluid comprising a semiconductor material carried in a carrier fluid, and causing the semiconductor material to deposit onto the surface of the one or more voids of the engineered microstructured material to form the metamaterial. Many microstructured materials and semiconductor materials can be used, together with various techniques for controlling the location, spatial extent, and thickness of the deposition of the semiconductor within the microstructured material, so that a wide range of different metamaterials can be produced.

BEST AVAILABLE COPY



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*